

Southern Cross

SouthernX-AM

Assembly/manual



SouthernX-AM was designed for indoor freestyle and aeromusical flying.

It can make tighter turns in a small gym than a general 3D aerobatic model.

It is not as easy to break as a standard Depron machine due to a hybrid structure of EPP and Depron, which also produces a lighter airframe.

Moreover, you get the rigid feeling of a Depron machine with a firm airframe, and the rudder works very accurately even though half of it is made of EPP.

The airframe data of the SouthernX-AM for the FMS RC simulator can be downloaded free of charge from the homepage of the 'RC airplane experiment atelier'. Please use this for flight practice.

RC airplane experiment
atelier homepage :

<http://rcp.web.infoseek.co.jp/>

FMS用SouthernX-AM



Please read from the beginning.



Warnings

Please never use radio equipment within a 2km range of an official RC Club.

There is a possibility that a serious accident could occur if radio interference caused a large-scale machine to crash. Also, please do fly near buildings, power lines, or busy roads.

The propeller is sharp, never touch it while it is rotating.

Please be careful of the propeller when hand launching the model.

Building this model requires using retractable knives etc. While building, please be careful not to injure yourself.

Please fly responsibly. The manufacturer or place of purchase cannot assume any responsibility in the event of an accident.

Changes to the design and price of the model are subject to change at any time.

● Example of suggested power unit and equipment.

- | | | |
|---|-----------------------------------|------------------------|
| * Brushless Motor of 20g or less | : AXi 2203/52 (for indoors) | 2203/46 (for outdoors) |
| * Propeller that suits motor | : GWS Slowfly 8x4.3 etc | |
| * 2x 4.7g servos for elevator & ladder | : Dymond D47, Ripmax SD-100 | |
| * 8g or lighter servo for ailerons | : FUTABA digital microservo S3154 | |
| * 10g or lighter speed controller | : Phoenix-10 THUNDERBIRD-9等 | |
| * 4g Receiver with 4 channels or more | : Berg4推奨 | |
| * 300mAh 2 cell Lipo battery of ~ 20g | : HYPERION HP-LVX300-2S 等 | |
| * Connector of 1g or less for lipo and speed controller | | |

● Items necessary for assembly

- * Adhesive with which polypropylene can be bonded
(UHU POR, UHU Creativ or clear Scotch 3M strong plastic adhesive)
- * Epoxy adhesive
- * Instant adhesive - CA (medium viscosity and low viscosity)
- * Hinge tape
- * Glass tape (Filament Tape)

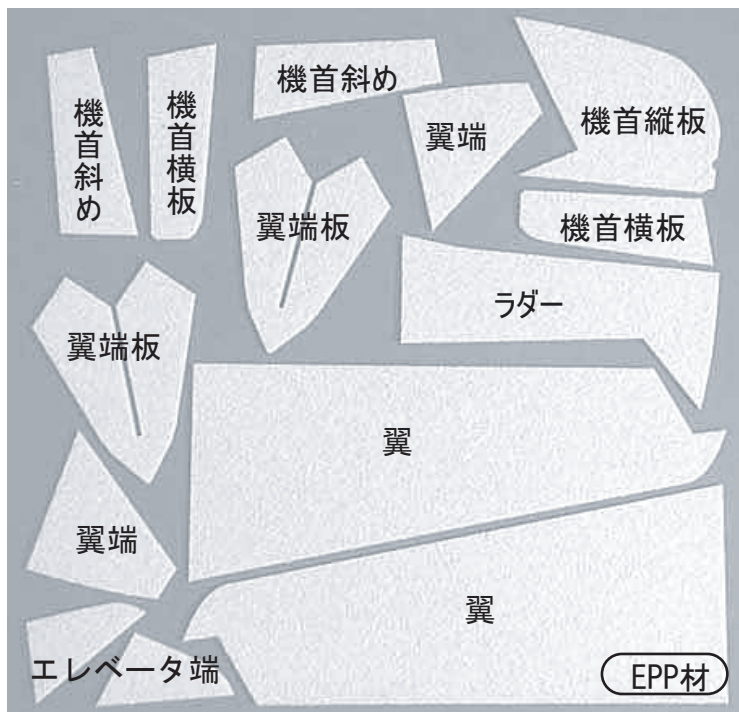
In this manual, when the adhesive is not specified, it is assumed that the adhesive with which the polypropylene can be bonded is used.

● Tools required for assembly

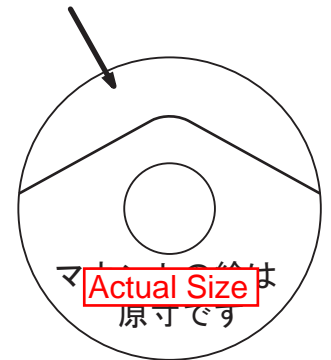
- * Knife (A knife with a 30° blade is recommended)
- * Needle (Use it attaching the kevlar thread to the tail)
- * Lighter (Use it to heat the shrink tubing.)
- * Long nosed pliers
- * Scissors
- * Cutters
- * 1.2mm drill (To make screw holes in the motor mount and to enlarge the holes in the wheels)

● Additionally items that might be useful.

- * Eight unused VHS videotapes
(To hold the airframe during building, and also used as a main wing installation jig.)



For the AXi2203 motor
As shown in this figure
Please cut out the upper part



Motor mount
(made of polypropylene)

Micro screw
(for extension horn and thread fixing)



2mm washer
(for pull-pull thread fixing)

Self-Tapping Screws (for motor installation)

Aileron servo
Extension horn

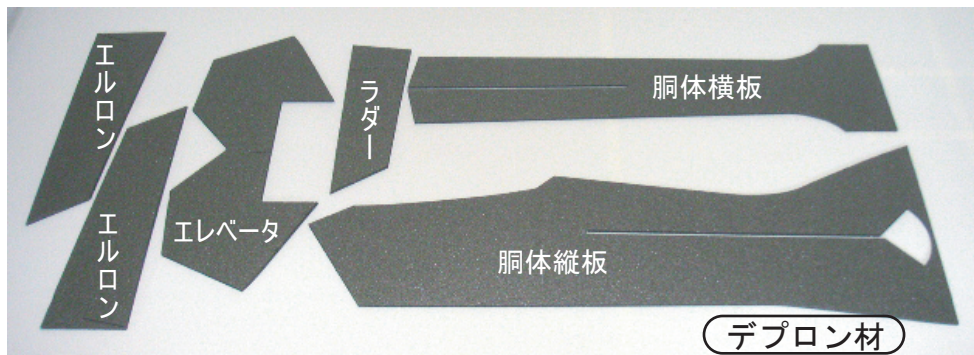
Elevator horn

Rudder horn

Aileron horn

Wheel
Stopper

Pushrod retainer



Body diagonal reinforcement

Other parts

Wheels

Canopy

Shrinkage tube(for linkage rod)

Kevlar string(for bracing wire)

PE line(for pull-pull linkages)

Round Kent paper(for body reinforcement)

Carbon rod 1.2mm 1.5mm

Carbon strip

Piano wire 1mm

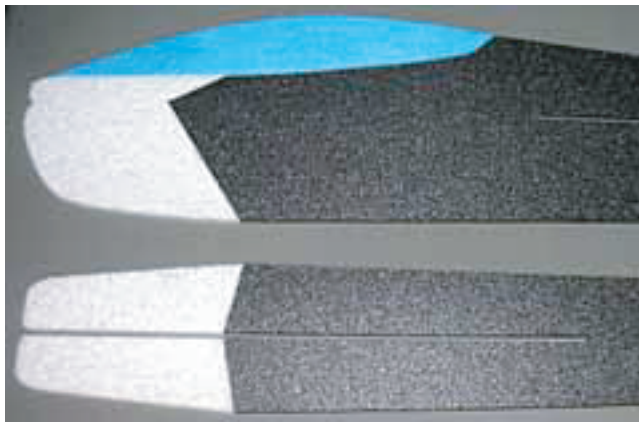
Sponge

PE line

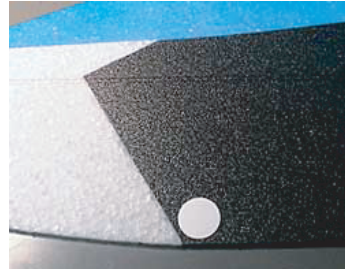


Kevlar string (yellow)

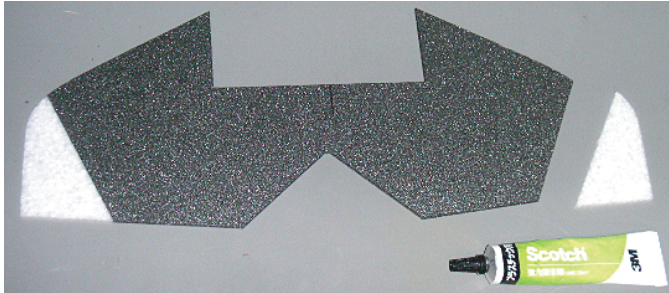
Please hang a weight of about 2kg from the PE line before using,
leave for several days until it has stopped stretching.



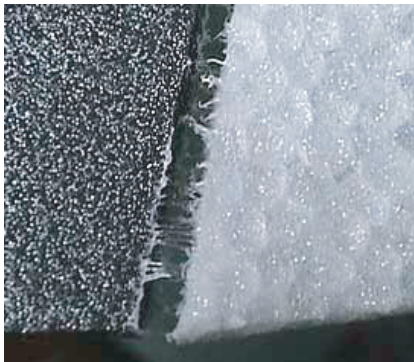
Glue the body, nose, and canopy together as shown in the photograph.



Glue the round Kent paper on both sides of the fuselage as shown in the photograph.

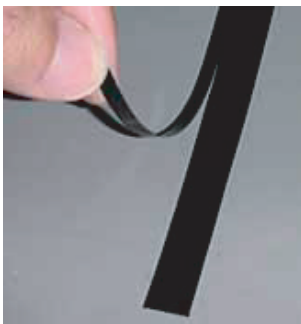


Glue the elevator and the rudder together also as shown.



When you bond the edges It is possible to bond more strongly by repeatedly joining and separating each material until the adhesive pulls apart leaving strings.

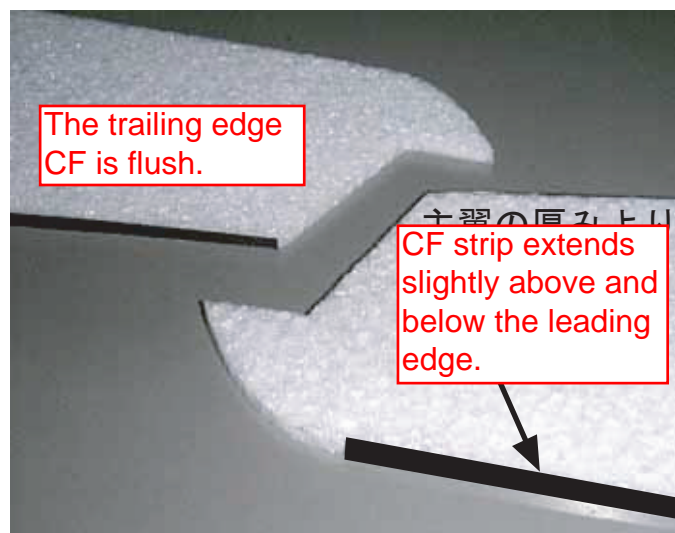
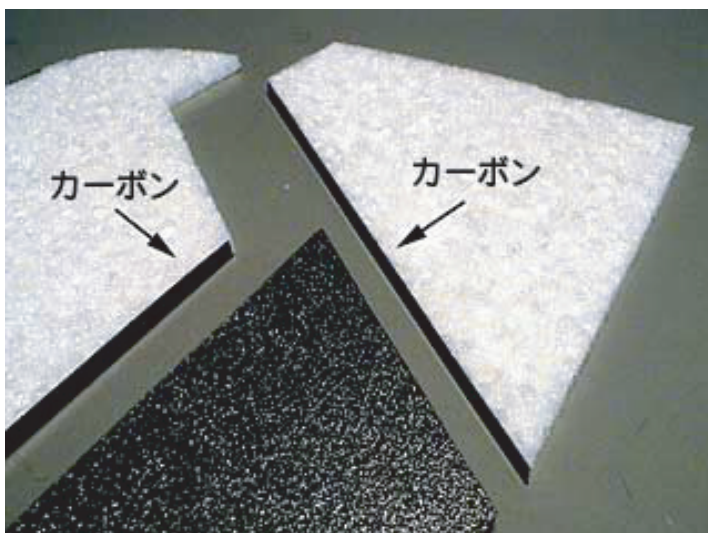
If the edge of the Depron material is not completely square, it is possible to mold it by rubbing several times with the side of a pen until it becomes completely square.

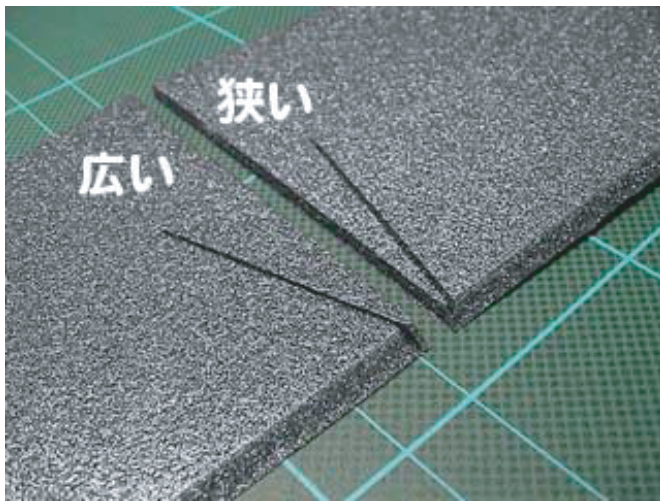


Cut the edge of the carbon strip with scissors. You can then tear 3mm wide strips to glue to the trailing edge of the main wing, and the aileron tips.

Please tear a strip 4mm wide or more to reinforce the leading edge of the the main wing. (The purpose of this is to achieve a turbulent flow of air on the upper and lower sides of the main wing.)

The edges of the carbon strip will be very sharp.
Be careful you do not cut yourself!

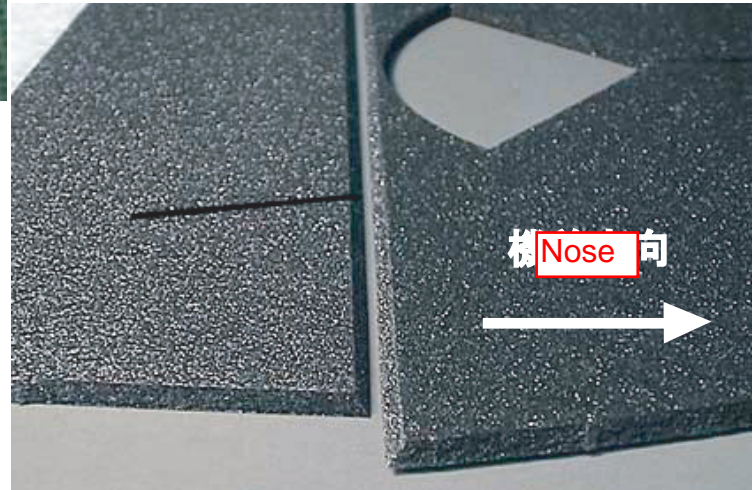
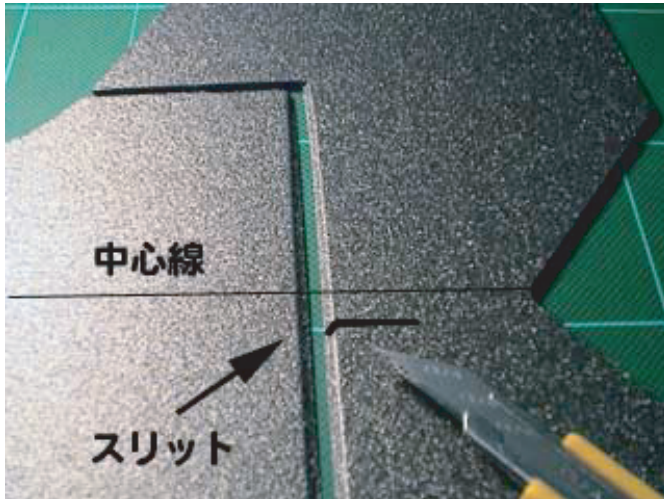




Cut a 45° bevel on the hinge side of the aileron. Please note that the right and left ailerons are different, the slits for the aileron horns are at different angles due to the servo being offset.

The aileron and the elevator hinges are on the upper surface, and the rudder is a left side.

Bevel the rudder and the vertical stabiliser with the same angle.

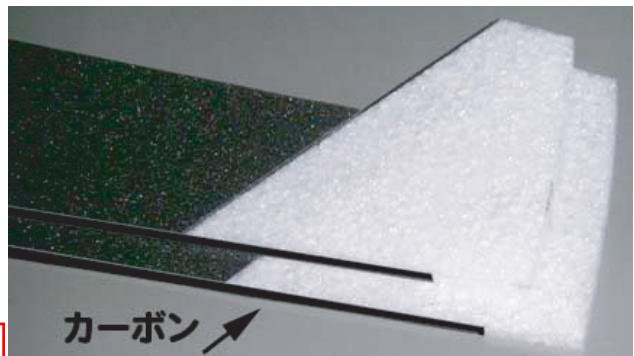


Bevel the elevator and horizontal board also with the same angle.

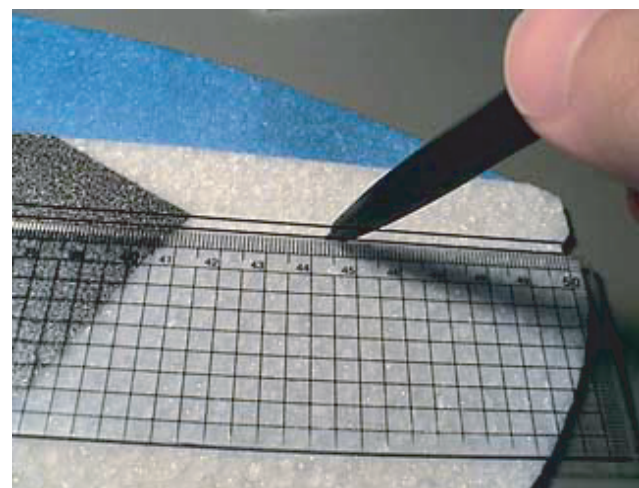
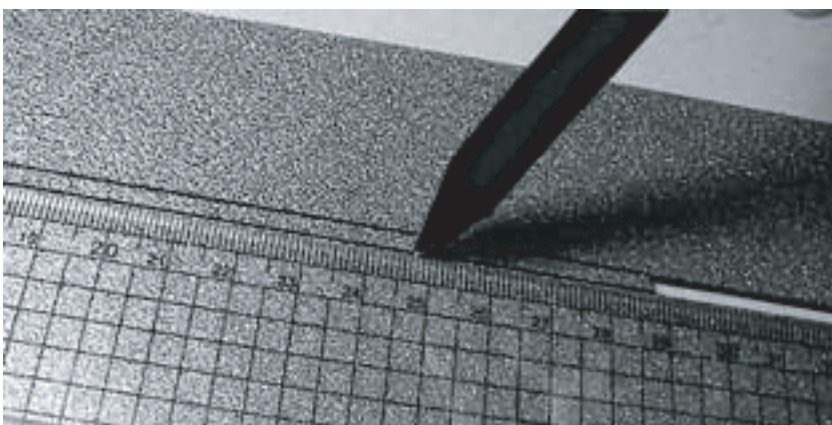


エルロンと翼端部を接着します。
この部分はカーボンを挟むように接着することになります。

The carbon is glued to the trailing edge of the aileron to absorb the impact of a crash.



とします。



Draw lines to use as guides when gluing the fuselage and horizontal board together.



The horizontal board is inserted from the back.

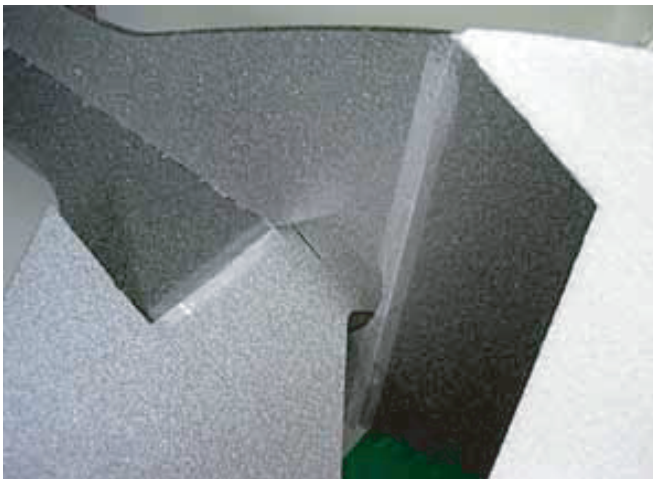
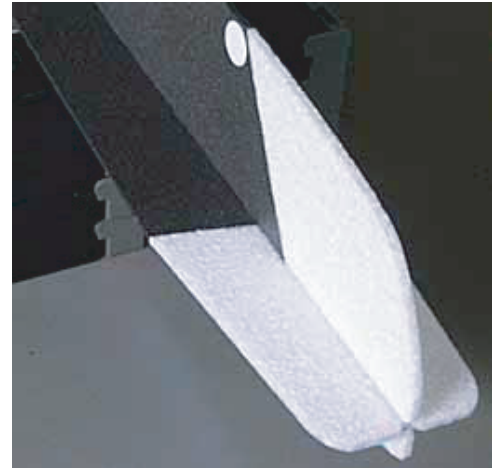


Please insert the elevator at this time.



Apply adhesive to the areas where the guide lines were drawn. Make sure to attach the parts squarely.

Because it becomes difficult to put on the table it is convenient to use videotapes as a stand.



Install the elevator and rudder using hinge tape.

Please confirm that they can both deflect 45° in both directions.

The hinge tape doesn't have enough adhesive strength for Depron and EPP.

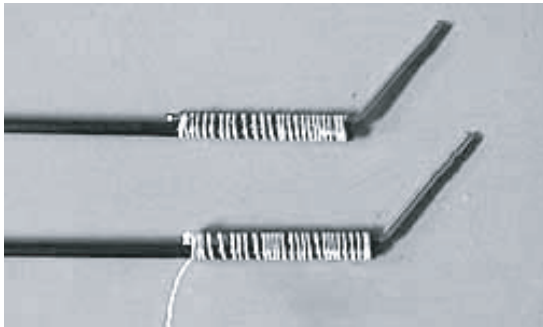
Apply glue to the areas beforehand, and when dry apply hinge tape.



Apply hinge tape to the opposite sides of the hinge areas where the control horns locate.



By cutting and bending the piano wire make the parts shown in the photograph opposite. This photograph is almost size. Even if the parts made are not too accurate, it will be okay. Cut the thicker carbon rod in half and bind the piano wire axels to the two rods using Kevlar string, securing with CA.



The carbon rod breaks more cleanly if it is gripped with pliers and folded by hand.

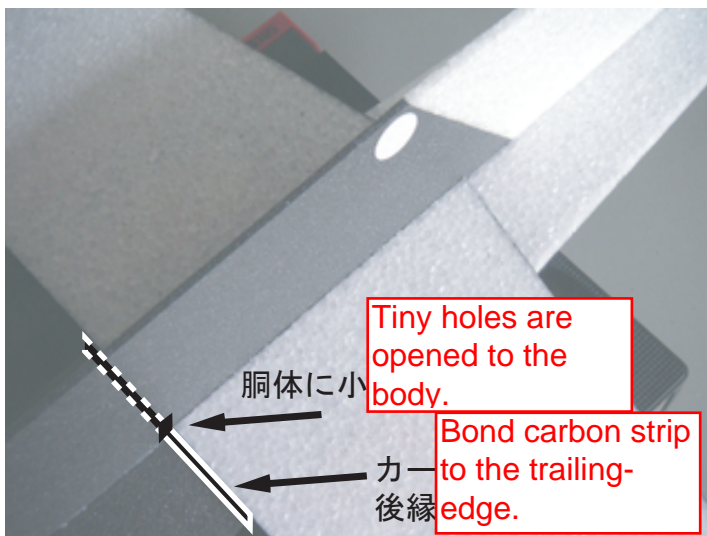


Enlarge the holes in the wheels using a 1.2mm drill so that they will turn smoothly on the axels.

The wheel stopper is held in place with adhesive.

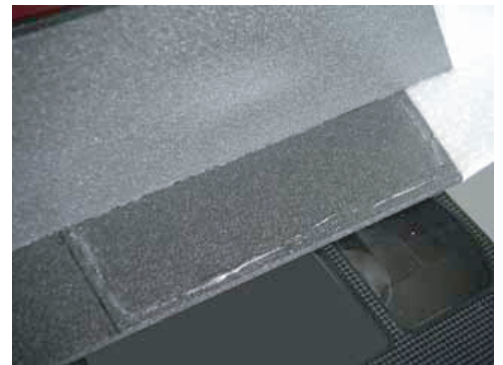
The main wing is bonded under a body horizontal board.

The point where the EPP and Depron meet is the position of the leading edge of the main wing.



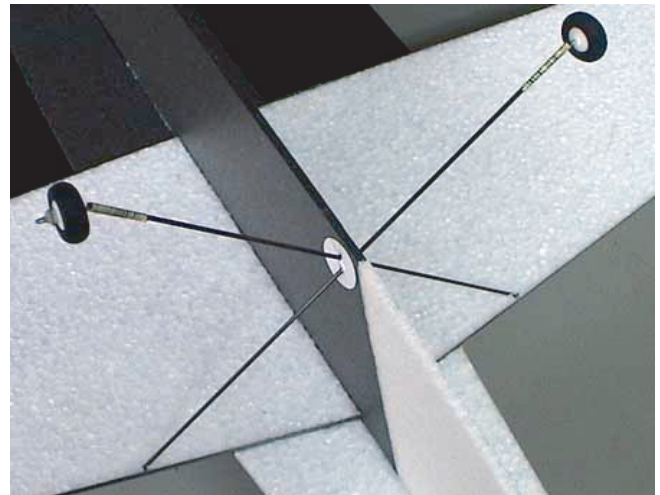
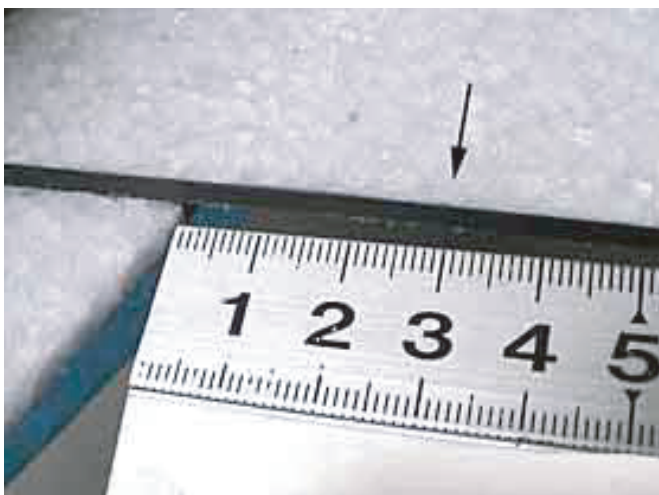
Tiny holes are opened to the body.

Bond carbon strip to the trailing-edge.

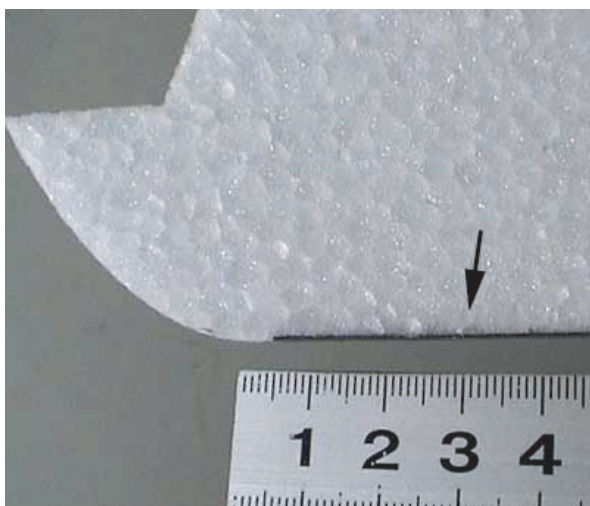


Because most of the wing's weight is supported by the bracing rods, it is not necessary to glue the entire area.

Use a 3mm wide piece of carbon strip (about 85mm in length) and bond the trailing edges of both wings together passing through the fuselage as shown in the photograph above.

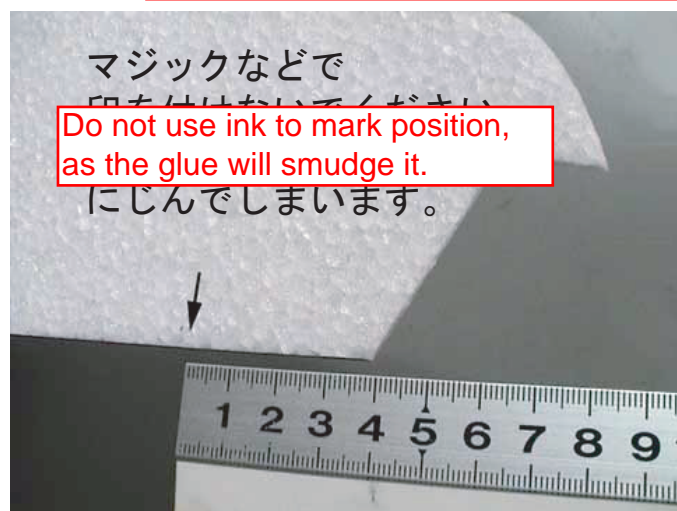


Make a small cut in the leading edge of each wing, 30mm from the horizontal board. Push the landing gear carbon through the Kent Paper reinforcement disc and insert into the wing. (Do not glue yet.)



A carbon rod bracing wire goes from a point 30mm in from the radius of the leading edge of each wing.

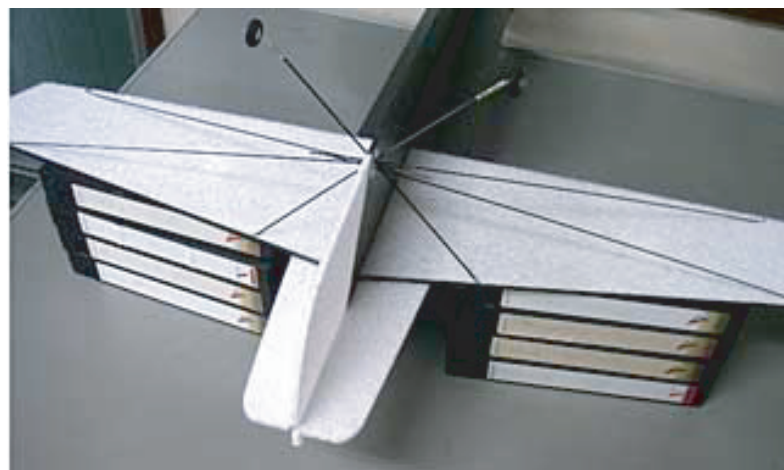
Make small diagonal cuts aiming in the direction of the reinforcement circle



Do not use ink to mark position, as the glue will smudge it.



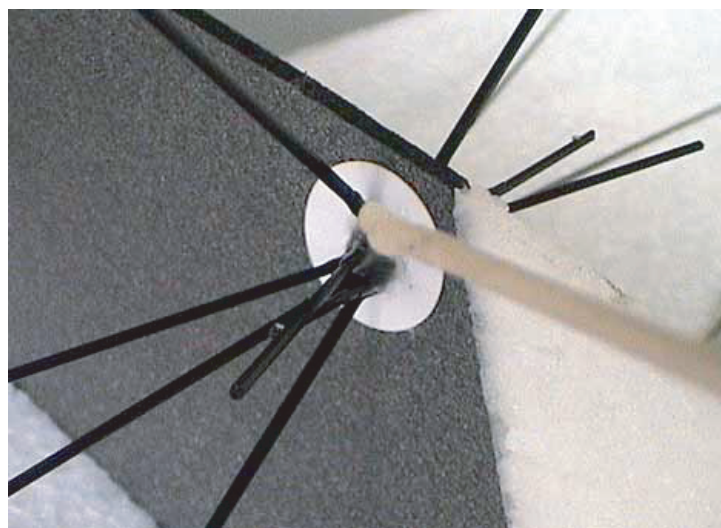
Another carbon bracing wire goes from a point 40mm in from the tip of the trailing edge of each wing.



All of the four carbon rods for the main wing bracing wires are inserted through the Kent paper reinforcement disc and located in the cuts in the main wing.

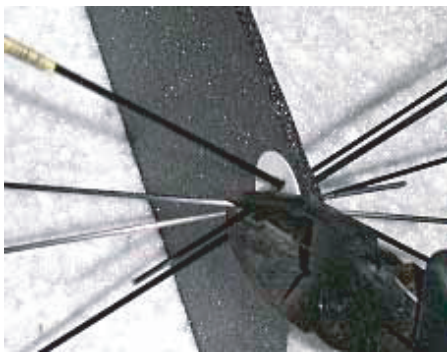
Videotapes are useful here to make a jig for supporting the main wing.

Make sure the bracing wires are as straight as possible.



Make sure there is no twist or distortion in the wings and that the wheels are aligned. When everything is properly aligned, glue the carbon to the EPP with medium viscosity CA.

Epoxy is painted on the parts that intersect in the body, and the carbon rod is bonded.



Leave overnight to harden then trim excess with cutters.

The aileron is attached to the main wing using hinge tape.
(Please use adhesive to improve adhesion.)

Please attach hinge tape to the other side in the area where the horn attaches just like the tail.



Horns are glued to each moving surface.
The aileron horn is on the lower side of the wing.



Connect all the electronics and confirm that everything operates correctly.
Ensure that the servos are in their neutral positions.

The center of gravity position for the model should be 90mm from the leading edge of the main wing at the root.

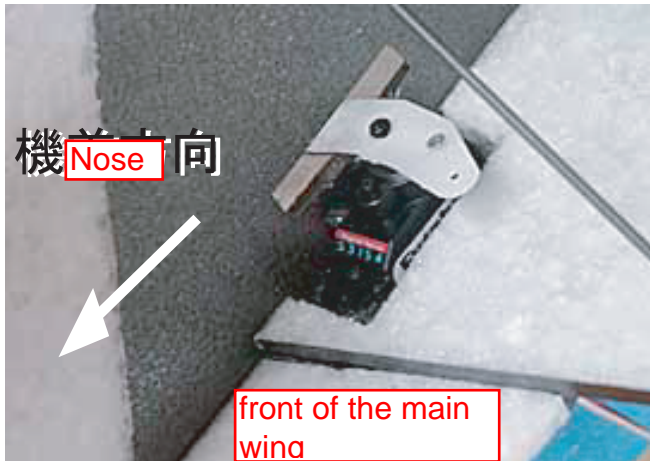
The installation positions might have to be changed according to the motor and the equipment used to adjust the center of gravity.



Arrange the electronics on the body of the model to find the best locations to achieve the correct center of gravity.



The aileron servo extension horn is attached to a standard servo horn with the screws provided. Please cut away an unnecessary material from the standard horn.

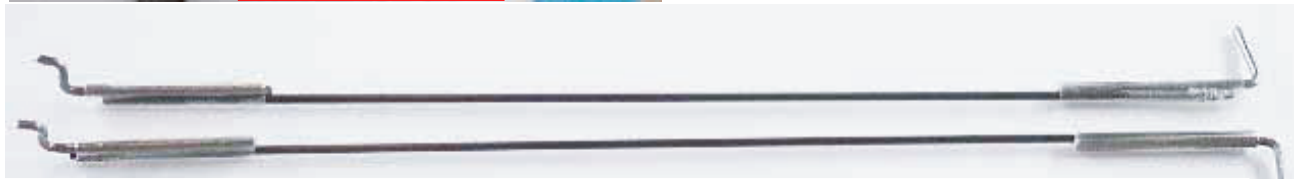


If using the recommended equipment then install the aileron servo in the position shown in the photograph.

(Please remove EPP in the position of the aileron servo completely.)

Glue the servo to the Depron using UHU Por when the position is decided.

The aileron horn should point to the back of the model as in the photo.



The aileron linkages are made by joining the carbon rod and the piano wire using shrink tube.

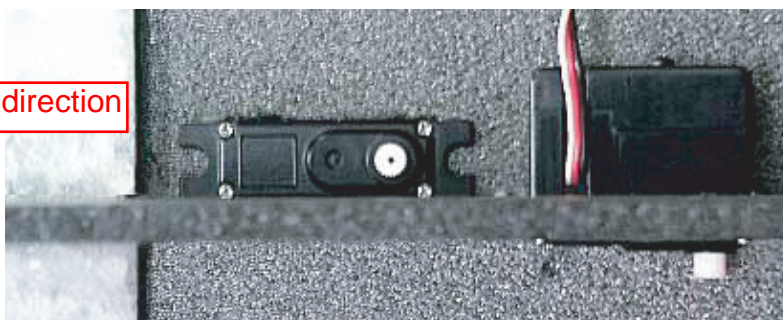
Shrink the tube with a lighter. The length can be adjusted later by gently warming the shrink tube with a lighter.



Secure the piano wire of the aileron linkage to the horn using the supplied stopper. Glue this in position with Epoxy so it cannot come off.

The length is fine-tuned with the battery connected and the servo in it's neutral position. Low viscosity instant adhesive (CA) is soaked into the shrink tube and the linkage is fixed.

Nose direction



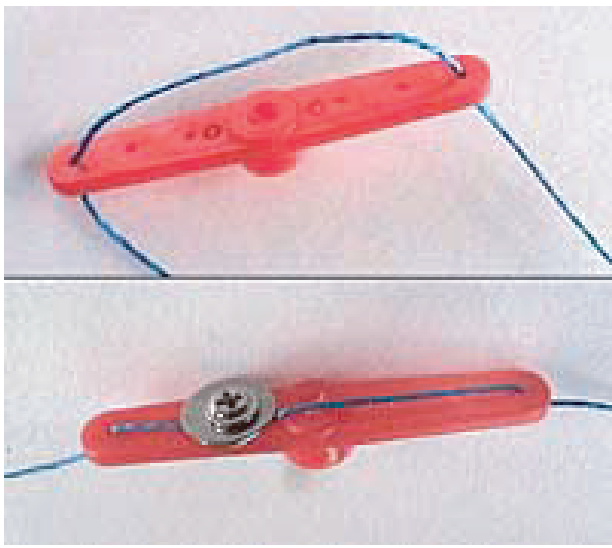
Install the elevator and the rudder servos at these positions. (This is a photograph from underneath.)

Ensure that the servo wires will reach the receiver.

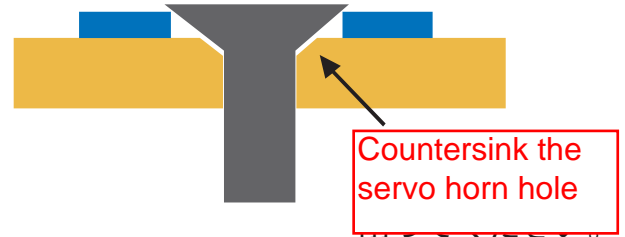
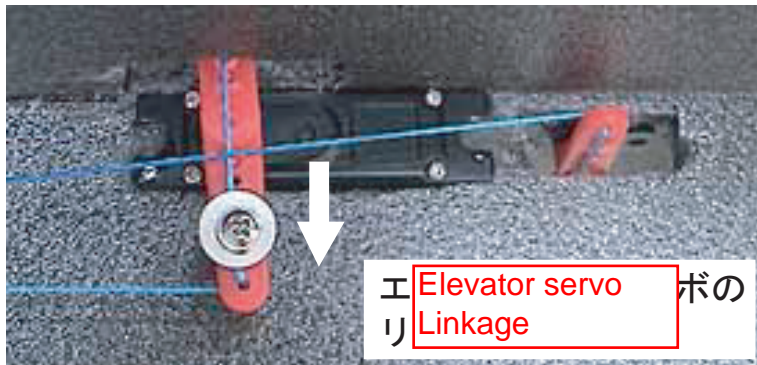
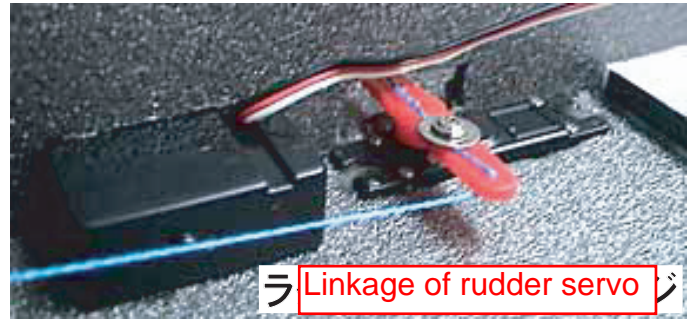
The servo is attached using UHU Por just like the aileron.



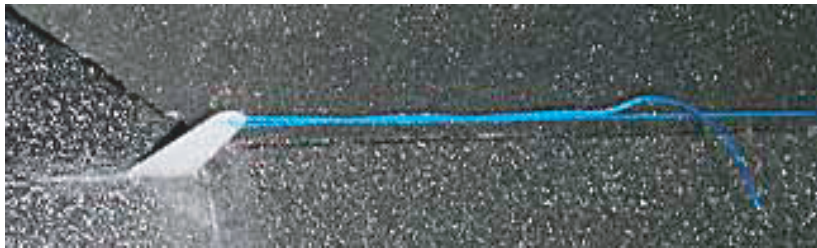
Make sure the holes are long enough so that the horns do not contact the body even at full throw.



Cut the PE line in half, and attach it to the servo horn using the washer and the screw supplied. The neutral position can be adjusted by loosening this screw.



Put the screw in an outer hole on the elevator servo horn so that it avoids contact with the rudder control line.



Pass the control line through the horn, wrap the line around several times and secure with instant adhesive. Trim excess line once dry.

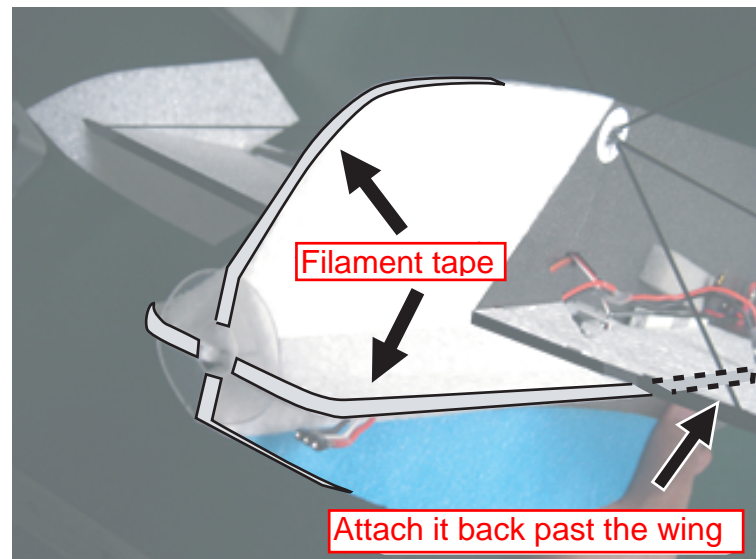
Be careful not to drop any instant adhesive (CA) onto the Depron!



The motor is screwed to the mount, and then glued to the nose. On this model, the down and side thrust should both be 0°.

Attaching the propeller helps confirm it is straight. It is possible to fine-tune it by placing the washer between the motor and the mount.

Cut filament tape into 3mm wide strips. Attach it so it extends from the nose side edges and onto the mount as shown.



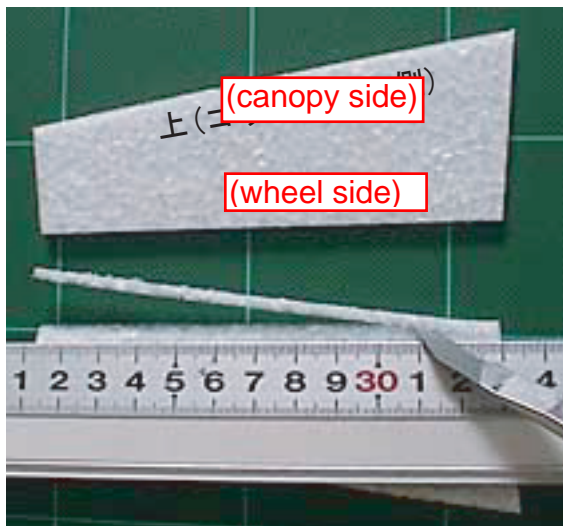
Please puncture a nose horizontal board and pass the esc wires through.



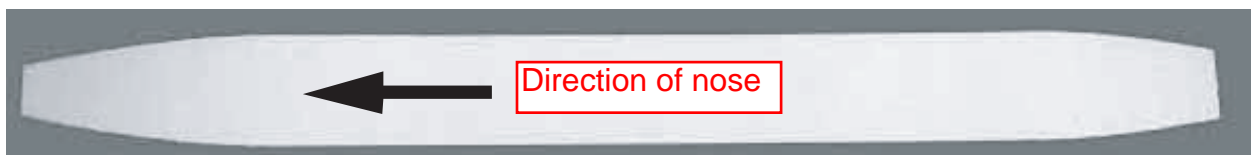
A position that doesn't interfere with the horn and the linkages is cut to pass wires through



The battery can be inserted by cutting a hole in the back of the main wing near the fuselage. Use the supplied sponge to hold the battery in position.



Cut 45° bevels on the diagonal EPP nose reinforcements and glue in position on the underside of the nose.



The body diagonal reinforcement is glued in position. It is quite tricky, so practice several times first so you can assemble it quickly.

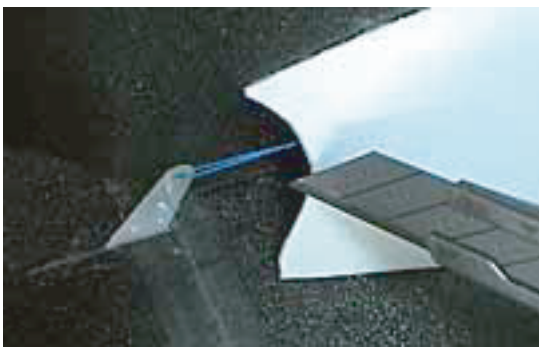


Apply glue to the side edges of the diagonal reinforcement as shown.

Excess glue can be removed from the Depron with tape.

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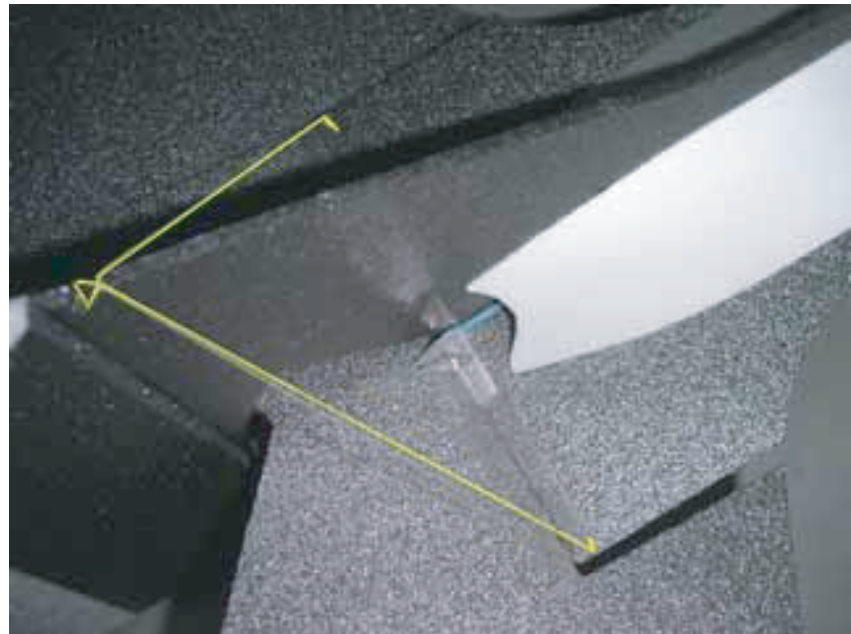
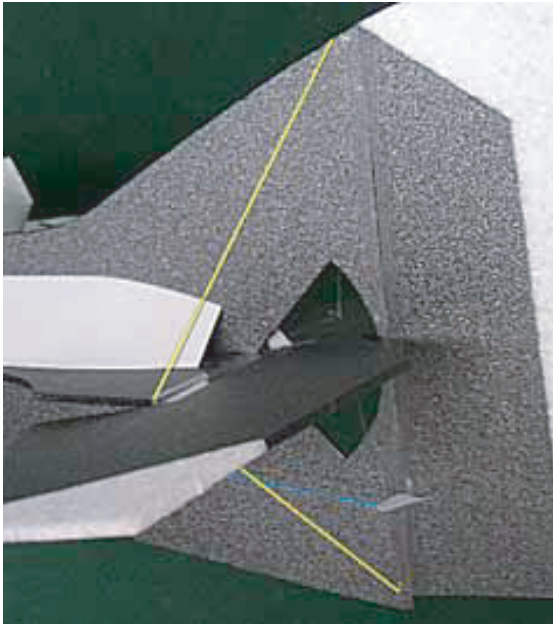
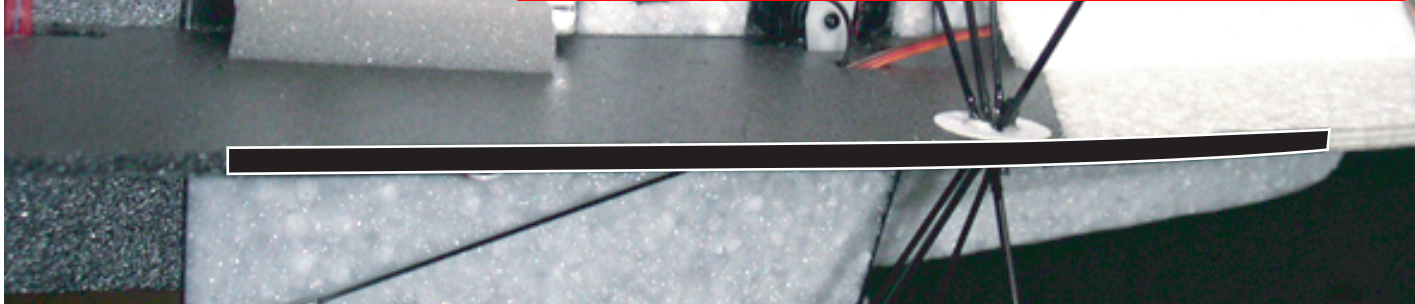




Please trim the rear end a little so as not to hit the elevator linkage.



Carbon strip is glued under the tail and main part of the body.



Brace the fin, rudder and the horizontal tail with Kevlar string. It is not necessary to make this too tight. When the position is decided glue in place using UHU Por.

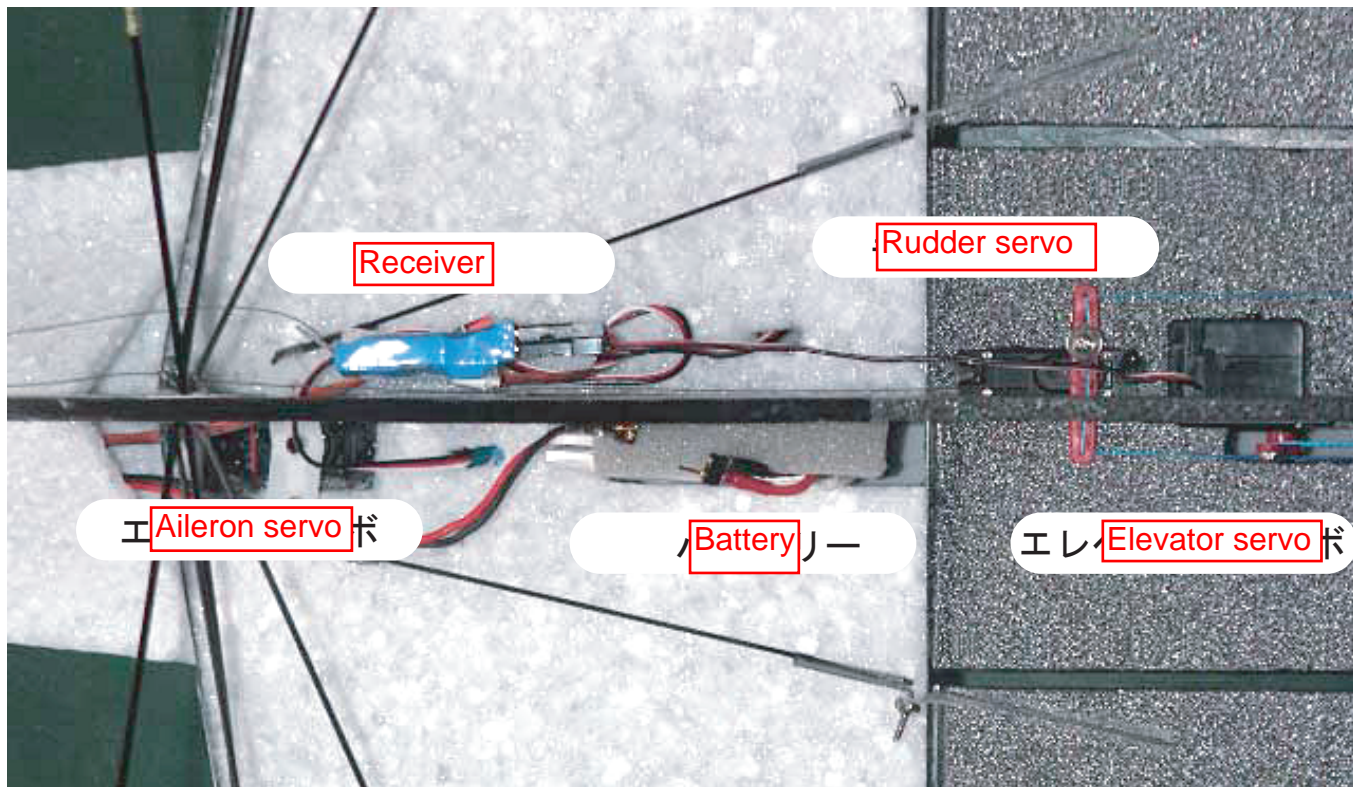


The SFG's make a difference to how the model flies. The angle shown in the photograph is recommended, although you may like to try different angles by attaching using tape to begin with. When the optimal position is decided please attach firmly using UHU Por.

The model is designed assuming that SFG's will be used. If not used then knife-edge flight and axial rolls become more difficult. For outdoor use it is recommended that they are attached facing forwards rather than not being used at all.

Note that the angle of the SFG shown in the photograph is a little shallower than the angle of the aileron tip.

Electronics Layout Photograph.



SouthernX-AMのRecommended Settings

The standard travel of each surface should be 45 degrees.

30% Expo is recommended for the elevator.

(When using high speed servos, 50% expo is recommended for the elevator and 20% is recommended for the rudder)

There is no need for knife edge mixing.

Please store the model by hanging it by string wrapped around the prop saver if possible.

Due to the small wheels, there is a possibility of cracking the Depron if the wheels get caught in grass or hit stones when landing at speed. When flying at a field without a paved runway it is recommended that the model is caught by hand or landed softly in a harrier style.

(Of course there is no problem at all when landing in a gym.)



Comments from the designer (Sekiai)

When you fly the SouthernX-AM you will immediately notice how quickly and precisely the model will respond to your control inputs.

During flight it feels like you are directly connected to the model.

I hope that your enjoyment of flying RC is increased by many factors.

Please try new techniques with this airframe. And, when you become accustomed to the behavior of the airframe I will recommend that you put on your favorite music and fly to it (aeromusical).